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INDIVIDUALITY IN INDUSTRY*

By Robert B. Wolf

The author has endeavored to point out in the paper a practical method of applying to industrial life the fundamental principle that individuality is a necessary complement of all creative activity.

He begins by first showing some of the defects of the present industrial organizations (especially the larger corporations), pointing out briefly the forces which combine to produce these conditions.

There are some few constructive suggestions in the first part of the paper, inserted, however, merely to emphasize the weakness of the present system.

The second part of the paper is entirely constructive in nature and is an attempt to define what is meant by individuality. In order to do this, the author uses as his illustration the highest known development of individuality on this planet, namely, the human body, and makes an analysis of the various elements which enter into relationship with each other to produce the unity from which the personality emerges.

Quite naturally a description of the human nervous system must be given in order to show the controlling mechanism through which the individual directs his activities. This is done

1st. By showing analytically that every movement of the physical body is controlled through the nervous system.

2d. Continuing the analysis by describing the three great divisions of the nervous system, and

3d. By a synthetic argument which indicates the wonderful grouping of the nerves into one great system in which each part performs its own peculiar function (illustrating the highest type of specialization) but with constant relationship to the good of the whole.

After pointing out that human progress has been made possible only through the development of the nervous system, with its consequent unifying and memorizing powers, the author indicates the necessity of establishing a similar system in industrial organizations. He points out that the reason for this conclusion is obvious, when it is recognized that any organization must make progress as a unit and unless this unity can be established and perfected progress in the development of the particular art it represents will be extremely slow.

In other words, the organization as a whole must develop into a conscious individuality, capable of specializing the generic laws which it is using in order to turn out the finished product.

It is not enough for each individual in the plant to act in this conscious manner, for unless these individual activities are all guided in one resultant direction, which is toward the perfection of the plant output, there can be no great improvement in the methods used and there is little hope of increasing the efficiency of operation.

Finally the author points out how the only real method of developing plant unity is in paying the greatest amount of attention to the development of the personality of the individuals making up the organization; stimulating them to creative efforts, by allowing freedom of choice and action and an opportunity to express, in the direction best suited to their natural fitness, what they most enjoy doing.

This naturally simplifies an educational system built upon the broadest lines and calling for a high grade of intelligent leadership throughout. This being provided, there will be no trouble in securing respectful attention from those receiving instruction.

It is the unification of all these forces, however, to give individuality to the organization, that is the main theme of the author's paper and he points out a practical method by which the principles outlined can be applied,—a method, in fact, which is already in operation in the largest industrial concern of its kind in the country.

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*Abstract of a paper to be presented at the meeting of the society to be held at Boston, May 21, 1915.

THE INDEX AS A FACTOR IN INDUSTRY[1]

BY JOHN H. WILLIAMS

With the development of industry, both in the vastness of the individual organizations and in complexity of products, the need for adequate means of designation, necessary to the recording of information and methods has increased, and with the advent of Scientific Management, this need has become a necessity.

To meet these demands, an index constructed of symbols, which serves not alone as an index, but also co-ordinates every material thing and function with which the business involved is concerned, and known as the Mnemonic Index, was devised.

The idea of mnemonic symbolization goes back to the first efforts of men to record thought and events. These records were wholly pictorial, and were both mnemonic and symbolic. This simple beginning has gradually developed into a method of literal designation through the use of our present-day alphabet and numerals.

In the mnemonic index, we return to the early principle that the symbol shall suggest a thing or thought, rather than define it. In the place of pictures, we use letters which are given added significance according to their position in the symbol.

Mr. Taylor in "Shop Management," in giving credit for suggestions of which he availed himself in building up his method of industrial control, in paragraph 459, refers to:

> The Mnemonic system of order numbers invented by Oberlin Smith and amplified by Henry R. Towne of Yale and Towne Co., Stamford, Conn.

Mr. Smith's method is described by him in a paper entitled "Nomenclature of Machine Details," read before the second regular meeting of the American Society of Mechanical Engineers, held in Altoona, Pa., in 1881. The principal feature in this method, outside of the effort to make the symbol mnemonic, was the use of symbols in such a way as to suggest the grouping of the several machine parts.

Mr. Towne, writing concerning his method, in a letter dated June 30, 1903, says:

> . . . the system of symbols for shop accounts which I devised many years ago, and which I still use.—The essence of this consists in using letters in the same manner in which figures are used in the decimal system, i.e., by making the value of the symbol depend on the "column" or position it occupies relative to a base.

These methods have been further elaborated by Mr. Taylor and Mr. Barth and others of this group in the intervening years, so that there has been built up for the classification of the products of the industries in which Scientific Management has been introduced a philosophy which is quite remarkable in its adaptability and significance.

In so-called tonnage work, where the product is prepared raw material, the symbolization of the product is a simple matter, and one without much industrial utility. Before one has gone very far, however, in the symbolizing of an automobile and its parts, and the materials and operations necessary to produce them, or a ten-inch disappearing gun carriage, such as is manufactured at the Watertown Arsenal, in which there may be over 4,000 individual parts, manufactured out of perhaps fifty different kinds of material, the difficulties become apparent, and in the absence of a comprehensive system of symbols very little in the way of Scientific Management can be accomplished.

The idea of a comprehensive classification and complete index was inherent in Mr. Taylor's conception of industrial control. He has always held that every industry could be reduced to a definite number of functions and things. Over twenty years ago, he had worked out a classification and a mnemonic system of symbols for stores, tools, products and charges.

With the growing mass of material gathered by Mr. Taylor and his associates, the necessity for classifying and symbolizing instructions became apparent, and several definite and fairly successful efforts to bring all of the instructions of a business together into one co-ordinate whole were made. The standing order files of the American Society of Mechanical Engineers, and the Plimpton Press of Norwood, and the Code Book of Day and Zimmerman of Philadelphia, are the best examples of such indexing. The date of these ranges from 1908 to 1911.

While there has been a vast amount of time spent in the making of mnemonic indexes, so far as I am able to find, no rules have as yet been compiled for their construction. In the recent making of a mnemonic index, I found it necessary for my guidance to codify such rules. The purpose of this paper is to present my conclusions as a result of this work, with the hope that, whether or not you agree with them, they may provoke discussion, which will lead to further developments of what I believe to be the next logical step in the development of Scientific Management.

That I may be fully understood, I should explain that the work from which my conclusions are drawn was in connection with the intended introduction of Scientific Management into several concerns in the same industry at the same time, with a view to eventually having an unlimited number of concerns in the same industry operating under the same methods and instructors.

Also, that my purpose was the devising of an index, not alone for the usual purpose of indexing and designating stores, functions, products, etc., but with a view to, or I should say hope of, its usefulness as a medium through which to visualize management, as a chemist visualizes his formulas through symbols.

I have had in mind an ideal for Scientific Management, wherein a means will be devised of working out and visualizing management as separate and apart from actual management, as is the working out and visualizing of a machine separate and apart from its construction.

I believe the Mnemonic Index is the first step to this means, and, as far as possible, I have sought to make it applicable, even where its use has not been fully developed.

Imagine an architect making plans for a building without drawings, or a chemist expressing a formula without symbols; yet this is what we are trying to do in management.

It has not been many years since a large part of all experimenting was through empirical tests and actual practice. The present ability to experiment on a drawing-board means not alone the elimination of the excessive cost, but also the demoralizing effect of this method of development.

Development in management has and must continue to be through experiments "in the metal," so to speak, until we devise adequate means of expressing management on paper, comparable to symbols for chemists, drawings for engineers and notes for musicians. All who have tried to express management in written words or to improve or to experiment with purely word instructions must realize this fact.

There has probably been more waste in management than in any other form of human endeavor. It has until recently

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[1] A paper to be presented at the Boston meeting, May 22, 1915. Copyright, 1915, by John H. Williams.

been considered as intangible a thing as personality. The familiarity of the phrase "a born manager" illustrates this.

In no other form of endeavor has there been so much transient achievement. Vast businesses and enterprises of every description have risen within one generation, only to fall within the next, chiefly because the principles, as expressed in the methods used, could not be visualized and understood, so as to be maintained, and yet at the same time modified, to meet changing conditions.

This has to some extent been overcome in our large organizations, because habits established among larger groups are more permanent, and through subdivision of management into small units, so that only one unit is put in jeopardy at a time by the death or displacement of a single man. Yet, because the separate losses are minimized as compared with the whole, they are no less in the aggregate.

As an objective toward which to work, I have assumed that:

> A Mnemonic Index should indicate the subdivisions of accounts, both for accounting and statistical work, and it should co-ordinate every material thing and every function with which the business involved is concerned.
>
> It should serve as a Standard Classification for Accounting and an Index for the main subdivision of files. It should also designate all equipment and materials, down to the smallest tool and most insignificant article of sotres, and all products and functions with which the business is concerned.
>
> It should be easy of reference, and the symbols should be strongly suggestive, easily remembered, and susceptible to use as shorthand in writing instructions.

Turning first to physical characteristics, I suggest that a 1½-inch Standard Ring Book, No. S372, be used during the period of making, when the changes will be frequent. I also suggest that one thousand sheets of good, strong bond paper, 16 pounds to folio, be cut, say, 50 sheets to 8½ x 11, 200 to 8 x 11, 300 to 7½ x 11, 300 to 7 x 11, and 150 to 6½ x 11, and punched and furnished with index tabs.

The most general practice in structure is to divide the alphabet, omitting I, O and Q, into three groups:

A to D to represent Expense Symbols.

E to W to represent Product Symbols.

K to Z to represent Construction Symbols.

A sub-index representing every desired qualification of each designation is then developed from each root letter in each group. The Expense Symbols are constructed so that they indicate the method of accounting, and the Product Symbols an analysis of production.

The best results, however, are obtained through: the use of the entire alphabet without regard to groups to designate every root from which there may be occasion to construct a symbol; the confining of the symbols developed from each root to the qualifications of the root proper, and the use of these symbols in series.

This gives a series of small indexes, which together constitute the master index, from which separate codes for use of departments and individuals are made. It insures a minimum of diversity in the meaning and uniform significance of letters, and while giving the same fixed code for working indexes as the first-mentioned method, it at the same time offers a scope of designation, flexibility, adaptability and utility never before obtained.

The symbols under this method, being made of a combination of the same smaller symbols, used over and over again, in different combinations, are very easily remembered; whereas with the first-mentioned method, each symbol is built up independently, and must be remembered independently of every other symbol.

A	Auxiliary Departments	"Expense"
B	Business Departments	
C	Selling and Administrative Departments	
D	Manufacturing Departments	
E		"Product"
F		
G		
H	Sketches	
J		
K	Bindery Work	
L	Special Tools	
M	Merchandise shipped direct and Stores' solc	
N	Packing	
P	Printed Matter	
R		
S		
T	Type Setting and Plate making	
U	Publishing	
V	Worked Material for various uses	
W		
X		
Y	Construction, Equipment and Machinery	"Construction"
Z	Real Estate and Buildings	

LIMITED NUMBER OF ROOTS WITH UNLIMITED MODIFICATIONS

ROOT LETTERS

A	
B	BUSINESS—Managerial divisions, subdivisions, and employees, pertaining to administration and selling, as distinguished from producing.
C	COST—Outlay incurred, irrespective of time or form of payment.
D	DIRECT PURCHASE—Purchases made specially for a given product.
E	EQUIPMENT—Real estate, buildings, machinery, apparatus, furniture, and fixtures of all kinds.
F	FUNCTION—Duties and performances.
G	GENERAL—Managerial divisions, subdivisions, and employees, auxiliary or subsidiary to other divisions.
H	
J	INSTRUCTORS—Written information and instructions.
K	OUTSIDE PROPERTY—Material and supplies, which are not the property of the company.
L	
M	MANUFACTURING—Managerial divisions, subdivisions, and employees, pertaining to producing.
N	
P	PRODUCT—Separate parts, groups of parts, and completed articles, representing the definite stages through which materials and labor pass during the process of production.
R	REVENUE—Income accrued, irrespective of time or form in which now standing.
S	STANDARDIZED STORES—Materials and supplies, regularly carried in stock.
T	TOOLS—Hand implements, including small hand machines.
U	UNSTANDARDIZED STORES—Materials and supplies, not to be re-ordered when used, other than Direct Purchases, overruns, cuttings, etc.
V	
W	WORK PLACE—A subdivision of the premises, representing a definable section, for the purpose of designation in writing instructions and for distributing overhead expense.
X	
Y	BY-PRODUCT—Things of value, incidentally produced in the conduct of the business.

UNLIMITED NUMBER OF ROOTS WITH LIMITED MODIFICATIONS

There is no apparent difference in the symbols as they appear in the working codes under the two methods, though the difference in the master index itself is very great. The accompanying illustration, representing the first sheet of indexes under each method for the same industry, will best indicate this difference.* In referring to these methods, I shall hereafter speak of them as the "limited" or "unlimited" root method.

No claim is made for the particular root letters or designations used as illustrations, except with reference to the problem before me. These will necessarily be different to some extent in every industry. They may differ, even within the same territory, though this should not be.

The rules here given are compiled especially for a master index, made under the unlimited root method, but they are, with few exceptions, equally applicable to either or both methods. Before giving these rules, I wish to pooint out the exact relation of the two methods, and make it clear that the acceptance of the unlimited root method does not conflict with any principle involved in the limited root method, while it adds almost unlimited scope and flexibility.

The fundamental difference is in flexibility. The limited root index is like an arbitrary code, whereas the unlimited root index is like an alphabet or vocabulary, from which any number of codes may be written, all of them consistent, and no one conflicting with another.

In practice, separate working indexes (arbitrary codes) must be made for departments and individuals, whichever method is used. My preference is for the unlimited root method for the master index, because, while it in itself is limitless in its application and utility, the working indexes made from it are as fixed as with the limited root method.

RULES

One or more letters symbolizing words are termed Symbols.
MCFM Symbolizing the function of make ready in the cylinder printing division of the manufacturing department.

Each letter in a Symbol stands for a Designation:
M Manufacturing, C Cylinder Printing, F Function, and M Make Ready.

One or more Designations, expressing only one element in a Symbol are termed Factors:
MC and FM are each a factor in the symbol MCFM.

Factors when used by themselves are termed Symbols:
MC when used to indicate merely the Cylinder Printing division of the Manufacturing department.

The first Factor in a Symbol is termed a Root Factor:
MC in the symbol MCFM.

The first letter or Designation in a Factor is termed a Root Letter or Root Designation:
M in the factor MC.

The Root Factor in a Symbol indicates the subject of the Symbol:
MC in the symbol MCFM.

All the rest of the Factors in a Symbol qualify the subject of the Symbol:
FM qualifies MC in the symbol MCFM.

The Root Letter or Designation in a Factor indicates the subject of the Factor:
M in the factor MC.

All the rest of the Letters or Designations in a Factor qualify the subject of the Factor:
C qualifies M in the factor MC.

All Root Letters with their Designations and definitions of Designations should be written on 8½x11 sheet.

The Designations represented by each succeeding letter in relation to its position in the Factor should be written on the next smaller sheet. This allows for the use of a tag index for each Factor, and for each letter position in each Factor, without the possibility of confusion due to the number of tag indexes.

Each sheet should have all of the letters of the Factor up to the point of the qualifications of the last designation, with designation for each, written at the top, as
S—Standardized Stores.
K—Office supplies.
B—Book.
R—Register.

In the Limited Root method, there is no intentional dividing of symbols into Factors, and their root is determined by the group—Expense, Product, or Construction—to which the first letter of the symbol belongs. This limits the application of symbols to these three roots, subject to qualifications by the way and place in which they are used.

In the Unlimited Root method, every Factor in a symbol is indicated by a Root Letter, and the separate Factors, with one exception, are no more affected by the way in which they are used or by combination with other Factors than are words by use in different sentences.

The exception is when the letters B, G or M are used in factors, such as Cost, Equipment, Functions, etc., to designate the managerial or accounting divisions to which they refer, in which case they are not regarded as separate factors, even though the designation may be identical with that when used as root letters.

When two or more factors referring to the same managerial or accounting division are used in one symbol, these letters are used only once in the symbol, in the Factor Cost or Revenue, if any, or otherwise by themselves as a separate factor, and are omitted entirely from the other factors in the symbol.

Special care should always be taken to use the same word or designation for the same thing or meaning. For example, do not term money paid to employees in one place Pay Roll, and in another Wages or Labor. The opportunity for this type of inconsistency is limitless, and great care must be exercised to avoid it.

Without consistency, even to the use of capitals, the memory must act consciously. This makes the use of the index laborious. If the mental photographs of the index are consistent, it becomes as natural to combine factors as words, or to separate the factors in reading a symbol, as to separate letters in a word, or words in a sentence.

The same factor and all of its qualifications in every symbol should be represented by the same letter. This is possible because every factor is limited to the qualifications of the element it represents, and each symbol is merely a combination of factors. This consistency in the symbolic meaning of letters is of the utmost advantage in the matter of remembering and using the symbols.

While this same thing can be accomplished with the Limited Root method, it can only be done by first making a separate and complete index of each factor, and then building up the Limited Root symbols from these factors. In fact, it was through an effort to make the same factors in the different symbols under the Limited Root method consistent that the idea of constituting a master index out of these factor indexes was born.

It may at first seem that long symbols are inevitable under the Unlimited Root method, in that a factor is provided for every possible element in a symbol. This is not the case. A symbol may be long or short under either method. It may represent merely an item of stores, and it indicates whether it represents a charge for or against stores account, or the actual physical stores, though, personally, I prefer that the symbol should be complete without regard to its use.

It was for a time thought that under the Unlimited Root method it would be necessary to separate the factors by dashes. Experience has shown that this is not necessary. Each root letter seems to stand out with unerring certainty. Factors may be spaced, as in the case of words, and on the whole this is desirable, though in no sense necessary.

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*The absence of definitions in the Limited Root method illustration has no significance other than that the index from which this page was copied did not happen to contain them. They are given in the Unlimited Root method to illustrate certain features which will be dealt with presently.

As a matter of fact, for ordinary purposes of designation, there is very little use for more than one factor in one symbol, so that in such symbols we need not concern ourselves with the separating of factors. It is only when we come to the use of symbols in writing instructions that the utility of symbols is such as to create a real necessity for the separation of factors, and in this use it is well that they be separated by spaces, as in the case of words.

Every factor and every symbol should describe rather than arbitrarily designate the thing symbolized, just as the words railroad, typewriter and aeroplane actually describe the objects signified.

The principle of symbolization is familiar in chemistry, and parallels its use in industry in three important points:

1. Symbols are used for brevity and convenience in writing, as the single letter H, instead of the eight letters required to write the word Hydrogen.

2. As far as possible, chemists make their symbols mnemonic. Having used P for Phosphorus, they use K for Potassium, taking the initial of the Arabic name of Potash, Kali. In this respect, there is a great advantage in industry, because, whereas in chemistry there is only one name for the element to be symbolized, in industry there are an indefinite number of synonyms and alternatives for almost anything you wish to designate.

3. By combining symbols, chemists express the composition of every compound, as $H_2 S O_4$, without the awkwardness of stopping to say two parts of hydrogen, one part of sulphur and four parts of oxygen to express the action of sulphuric acid in a reaction. Similarly in industry, we combine charges, functions and materials, or any other combination of factors in one symbol.

The natural antagonism to the adoption of a new language, so to speak, is the occasion of some difficulty in the introduction of the Mnemonic Index into general use in an establishment, but where the symbols are truly mnemonic, and are so constructed that they classify as well as designate, they are soon found to be a more simple and natural form of expression for managerial purposes than words.

The three fundamental principles sought after in working out these rules have been—abbreviation, standardization of terms, and sequence of relationship. The facility of symbols in these fundamentals, to which words and phrases are but clumsily adapted, soon recommends them, even though the principles are not consciously understood, and has the effect of making the symbols apt and easy to use.

Words in language and their relationship, or lack of it, are the product of a myriad chance influences, even to the occupation and temperament of its primitive people, the influence of foreign and ancient languages, etc. The sequence of designations in symbols, on the contrary, is built up in a direct causal relationship, the subordinate growing up out of the more basic terms, as the leaves of a tree grow out of the twigs, the twigs out of the branches, and the branches out of the parent limb.

Coming to the actual construction of the symbols, the method of accounting should first be determined upon, including the subdivision of accounts, not alone for the general ledger, but for statistics, and also the method in closing the books. The actual accounting symbols should be completed and thoroughly tested before much, if anything, further is done.

The tying in of the accounting methods with the index is an essential of a proper index for an industry. The selection of the root letters is materially affected by the method of accounting, and every accounting symbol, besides being a designation, should at the same time be a derivative of the accounting significance of the item represented by the symbol.

The subdivision of accounts is indicated in the Factors by the order in which the letters occur, and in the symbols by the order in which Factors are combined reading always from the root to the end of the symbol. The closing of accounts is indicated in like manner, but by reading the factors and symbol backwards.

The master index should be fairly well developed as a whole and laid out in pencil and revised and made final only after the actual plan of management is determined upon and standing instructions have been written.

If the index is not fairly well developed as a whole, and without too much consideration for any one feature prior to its full development, it is almost inevitable that it will be unbalanced. On the other hand, it is impossible to perfect it beyond the accounting system, except in piecemeal, as investigation and classification go forward.

The following rules have been devised for the selection of letters and designations. They are no less important than the rules for physical and structural aspects already given. We should have constantly in mind the fact that the large number of persons who will be called upon to use an index have not trained minds, and have not the knowledge of the business, or the principles upon which the index is constructed to aid them in reading the symbols. No amount of pains should be spared in making the index absolutely mnemonic. Fine distinctions in the meaning of words should always be sacrificed to the selection of words which may be literally symbolized.

RULES FOR SELECTING LETTERS AND DESIGNATIONS

I and O should be omitted, as they are easily confused with the numerals.

Q and Z should be omitted, because they are difficult to write accurately.

Words beginning with I and O should be used as designations as little as possible, and when used, may be placed opposite J and K respectively. This is because these letters are seldom used, and, therefore, confusion through double meaning will be infrequent.

Words beginnings with Q and Z are better omitted as designations, and, therefore, no provision need be made for them.

Numerals may be used to qualify any designation. They are often desirable, and sometimes necessary where there are more qualifications than there are letters. They should be introduced before the designation which they qualify.

Numerals may be used at the end of a symbol to indicate sequence in the thing symbolized, as order or lot number.

Every designation should, as far as possible, begin with the letter opposite which it is placed on the index sheet. To accomplish this, all of the designations to go on a single sheet should first be written opposite the letter with which the designation begins. This will frequently cause several designations to be placed opposite the same letter. This is as it should be to start with.

Dealing with the letters opposite which there are more than one designation, look over the designations, and select the one least used. Then consult a Thesaurus (you must never work on a mnemonic index without one) and see if you cannot substitute some word beginning with a letter which has no designation opposite it, which for symbolic purposes will be equally descriptive. You will be surprised to see how often you find a better word. Even if the word is not as good, it is more important that the designation should be mnemonic than literal, so long as it is symbolic of the definition of the designation. Do this with all but one of the designations, of which there are more than one opposite a single letter.

When you use a letter to indicate a word beginning with some other letter than the one opposite which it is placed, and this process is repeated more or less throughout the hundreds or even thousands of uses of an alphabet within an index, there is literally no guide for the memory. Whereas, in substitution of one word or phrase for another, since you adopt and use the accepted word and phrase only, it soon becomes fixed in the memory, and the former word or phrase disappears as completely as though it had never been known.

When you have gone the limit under the foregoing instructions and there still remains a letter with more than one designation opposite it, select the designation least used, and put it opposite the second letter in the designation. If this is in use, then the third, and so on down, always, however, giving preference to a letter carrying the dominant sound of the designation.

In a designation two or more words as, Direct Purchase, the dominant or distinguishing word of the designation (Direct) is the word to be considered in determining the letter opposite which it shall be placed.

When you have once placed a designation opposite a certain letter as By-products opposite Y, see that the same word is opposite the same letter throughout the index. Consistency in inconsistencies is especially important.

In the foregoing list of Root Letters under the Unlimited Root method, containing 16 designations for 22 letters, there is only one designation which is not entirely mnemonic, J and K standing for I and O respectively, may fairly be regarded as mnemonic.

This paper is intended only as an outline of the principal considerations in the making of a mnemonic index, written for those who are already familiar with the use of letters as symbols in indexing.

It is generally recognized that man's intellect has not been materially augments throughout the period of recorded history and the progress of the later generations is due largely to accumulated knowledge and not much to superior intellect.

It therefore follows that progress is dependent upon the ability to record existing methods, since otherwise there can be no accumulation of knowledge, except through word of mouth.

Progress in the arts of painting and music, form probably the most conspicuous examples of this fact. While in their primitive form one is as old as the other, the progress in painting in which the recording of the method is indicated in the painting itself, has been comparatively uniform, while until about 1600, when an even partially adequate method of writing music was devised, there was practically no progress in music.

The first requisite in recording anything is adequate means of designation. Until the advent of Frederick W. Taylor, the functions and things involved in industry were thought to be innumerable, and for that reason were considered impossible of designation. But just as architectural or mechanical drawings and plans are completed before any of the physical work begins, and are then followed out to the letter, so since Mr. Taylor's application of the principles of science to management, and the consequent perfecting of the mnemonic index, it is now increasingly customary to make indexes and instructions for management, and to have them carried out to the letter as minutely and as literally as are architectural and mechanical plans.

The function of the index and instructor in managemem, the accuracy and facility with which instructions may be written to symbol, and the relation of these indexes and instructors in management—to assembled, detail, and working drawings in construction are fundamentals, the comprehension of which gives one some conception of Mr. Taylor's vision, which though popularized, is as yet but superficially and inadequately understood.

The Society to Promote the Science of Management

PROGRAM FOR THE BOSTON MEETING

FRIDAY, MAY 21, AND SATURDAY, MAY 22, 1915
All Sessions at the City Club, 12 and 14 Somerset St.

FRIDAY, MAY 21

8.15 P. M. Assembly Room, 3d floor
Individuality in Industry
By Robert B. Wolf, Burgess Sulphite Co., Berlin, N. H.
Discussion

10 P. M. **Informal Smoker in Grill Room, Parker House**

SATURDAY, MAY 22

Forenoon Visit to Watertown Arsenal
Special car will leave Scollay Square at 9.25 A. M.
Round trip 50 cents

1.30 P. M. **Luncheon,** Room I, 9th floor, City Club. 75 cents

3 P. M. Assembly Room, 3d floor
Business Meeting
Statement by the President
Remarks concerning Mr. Taylor
Report of Committee on Revision of Constitution

5 P. M. Assembly Room, 3d floor
The Index as a Factor in Industry
By John H. Williams, Poughkeepsie, N. Y.

6.30 P. M. **Dinner,** Room I, 9th floor, $1.25

8.15 P. M. Room I, 9th floor
Discussion of Mr. Williams' paper